



CALTRANS REGIONAL OPERATIONS FORUMS

Planning and Programming for
Operations





The Reality: Operations Today

- ▶ Surface transportation systems are made up of several independent networks
 - ↳ Freeways, bus/rail transit, arterials, etc.
- ▶ Most efforts to reduce congestion have focused on optimization of individual networks
 - ↳ Agency/facility/mode – specific ITS systems & strategies
- ▶ Minimal cross-network management in response to increased demand / reduction in demand





Important Differences between “Legacy” and “TSM&O” Approaches

Legacy (capacity) Program	Real-time Systems Operations (TSM&O)
Driven by peak period capacity deficiencies	Focused on non-recurring congestion causes
Long-term/high cost & impact projects	Short-term/low capital/low impacts
Individual Facility improvement oriented	Network, corridor or facility scale
Capital cost focus	Systems, staffing, O & M & upgrade costs
Projects implemented by owner entity	Requires significant external collaboration
Civil engineering driven/staffed	Systems engineering driven
Standard project development process	Project, procedures, and field operations
Project Development organization	Fragmented Operational Management



What is Planning for Operations?

- ▶ A joint effort between planners & operators to improve regional transportation system performance
- ▶ Focuses on integrating management & operations strategies in the transportation planning process
- ▶ Driven by objectives & performance measures
- ▶ Enhances regional decision-making process so that operations investments are on par with investments in construction & system preservation.

Integrating TSMO into Metro and Statewide Planning

- ▶ TSMO strategies are programmed & implemented in collaboration with local agencies





SMART Operations Objectives

- ▶ Operations objectives to be included in the plan are developed through collaboration with a broad range of regional participants and reflect regional values.

Specific. Sufficient to guide approaches

Measurable. Quantitative/qualitative measurement

Agreed. Consensus among partners

Realistic. Can be accomplished with available resources

Time-Bound. Identified time-frame for accomplishment

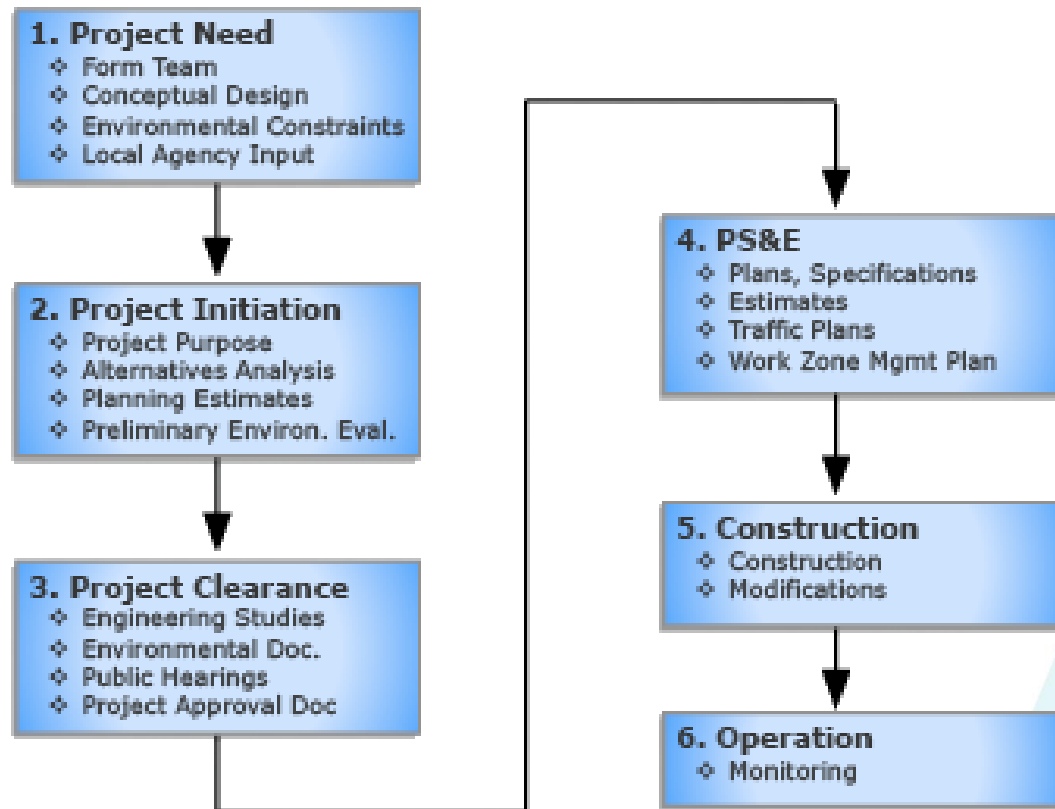


Sample Operations Objectives

- ▶ Improve average travel time during peak periods by X percent by year Y.
- ▶ Reduce the average buffer time needed to arrive on-time for 95 percent of trips on [specified routes] by X minutes over Y years.
- ▶ Improve average on-time performance for specified transit routes/facilities by X percent within Y years.
- ▶ Reduce time between incident/emergency verification and posting a traveler alert to traveler information outlets (variable message signs, agency website, 511 system) by X minutes in Y years.
- ▶ Increase customer satisfaction rating of the timeliness, accuracy, and usefulness of traveler information in the region by W, X, and Z percent, respectively, over Y years.



Legacy Program Development Process



- ▶ Typical steps from definition of need to Construction
- ▶ Focus is on design and construction
- ▶ Civil engineering-based
- ▶ Major costs and impacts impact process
- ▶ Project is “finished” after construction
- ▶ Maintenance in following years



TSM&O Today:

Demands of Aggressive TSM&O Applications

Proactive Operational Management

- Predict and prepare for disruptions
- Multiagency collaboration
- Automated decision support
- Interagency integration

Real-Time Operational Management

- Real-time Operations to maintain performance
- Involve multiple, synergizing strategies
- New systems and technologies
- Multiple players/roles

Static Supply

- Legacy Agency focus
- Supply fixed capacity
- Facility engineering
- Set-it and forget it
- Single agency control



Program Planning for TSMO





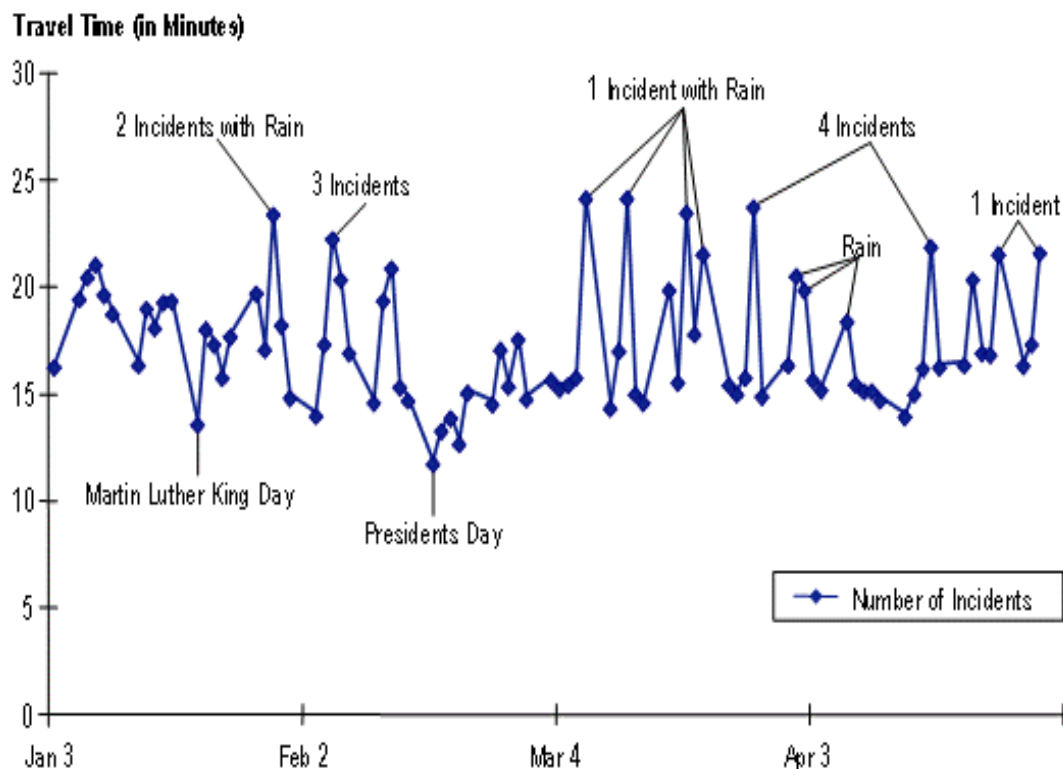
Important Components of TSM&O Program Planning

1. A “business case” – how TSM&O relates to agency mission/goals to get buy in
2. Performance measures to gauge progress and use in real time
3. A road map for sustainable strategy application improvements related to problems
4. Clear concepts-of-operations(architecture) to identify systems needed and roles of partners
5. An organizational structure and staff capable of coordinated operational management
6. Budget for sustainable funding (put forward to “planners”)
7. New forms of collaboration: within DOT, among partners – recognizing differential capacities



Supporting a Business Case

Figure ES.3 Weekday Travel Times
5:00-6:00 p.m., on State Route 520 Eastbound, Seattle, Washington



Non-recurring congestion is the major source of travel time unreliability



Supporting the Business Case

Comparison of returns for different road investments

Average benefit-to-cost ratios

Lower range
Upper range

"Traditional" road capacity

2.7

Electronic freight management system

2.8 3.6

Dynamic curve warning

4.2 6.6

Commercial vehicle information systems and networks

2.0 7.5

Maintenance decision support system

1.3 8.7

Intelligent traffic management

14.0

National real-time traffic information system

25.0

Road weather management technologies

2.8 37.0

Service patrols (traffic incident management)

4.7 38.0

Integrated corridor management

9.7 39.0

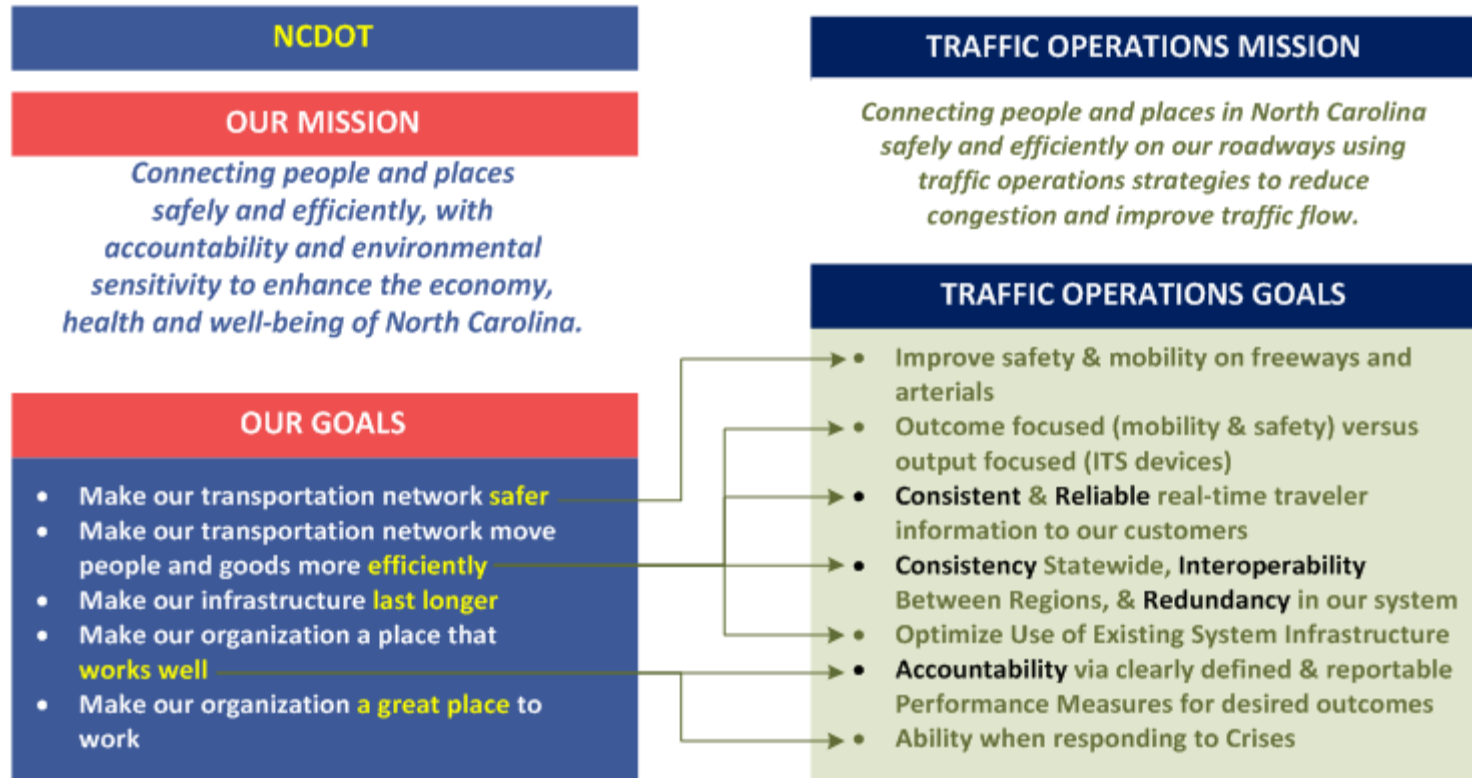
Optimized traffic signals

17.0 62.0

TSM&O is extremely cost-effective, compared to capacity enhancements



EXAMPLE: Making the Business Case: Aligning TSM&O with Agency Goals





What Are Some Other Ways to Make a Business Case?

- ▶ What would help make the case for your agency?





“TSMO Program Plan” Compared to Conventional “Plan”

- ▶ Link between mobility objectives and strategies to support them (especially for non-recurring congestion)
- ▶ Recognizes synergism among various TSMO strategies
- ▶ Addresses all the procedures and related roles of participants to conduct TSMO strategies
- ▶ Identifies *complete range of resources* required for effective operations –approach to staffing/training, conops, role definitions, real-time/field procedures and protocols, performance measures
- ▶ Incorporates incremental approach



Conventional Corridor Planning at States and MPOs

- ▶ Agencies use to focus on needs of specific area/corridor
- ▶ For multipurpose corridor strategies: mobility, access, development
- ▶ Includes freeways, arterial, multimodal
- ▶ Some Statewide Long-Range Plans may be based on corridors
- ▶ Some MPOs lead corridor studies and/or organize CMP on corridor basis
- ▶ TSMO version called “integrated corridor management” (ICM)



Developing an Integrated TSMO Approach



Some Important Shifts for TSM&O Planning

Traditional Planning Process

- ▶ Long-term planning focus
- ▶ Capital investment focused
- ▶ Project orientation
- ▶ Capacity-deficiency based
- ▶ Concern over environment
- ▶ Focus on limited links
- ▶ Recurring congestion only

Adjustments Needed for TSM&O

- ▶ Add Short –term payoff perspective
- ▶ Include non-recurring congestion
- ▶ Substitutions of TSMO for capacity
- ▶ Network wide applications
- ▶ Optimize operations/capacity investments
- ▶ Include Maintenance, staffing
- ▶ Uses Performance measures

TSM&O Managers Help Shift Planning Mindset

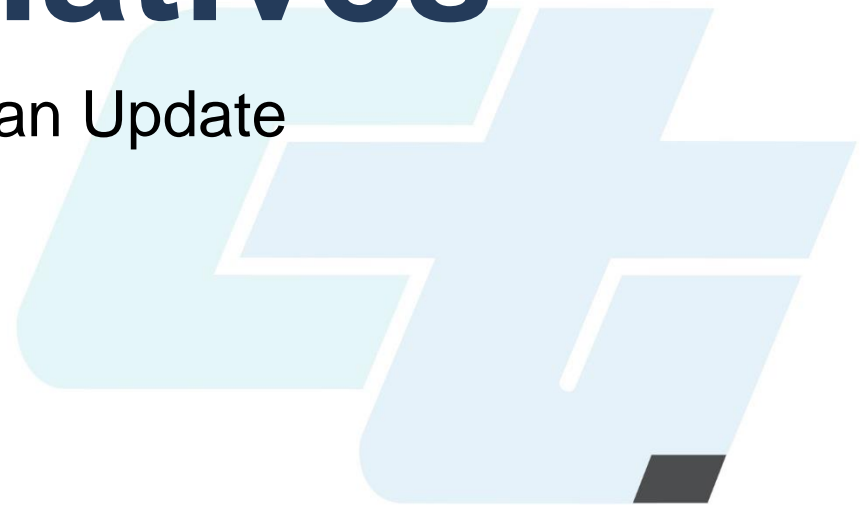


SACOG Initiatives

ITS Architecture and Master Plan Update



/ Kimley»Horn





What is a Regional ITS Plan?

- ▶ Vision for ITS for the Region
- ▶ Provides Operational Concepts and System Functional Requirements
- ▶ Agency Operational Agreement
- ▶ Plan for managing, integrating and Operating ITS projects





Why do we need a Regional ITS Plan?

- ▶ Coordinated System Management
- ▶ Inter Operability and Compatibility
- ▶ Coordinated Incident Management
- ▶ Consistent with Regional Goals





Coordinated System Management

- ▶ Congestion Management
- ▶ Shared Mobility/ Multimodal
- ▶ System Reliability
- ▶ Air Quality





Inter-Operability and Compatibility

- ▶ Consistency with Neighboring Infrastructure
- ▶ Smart City
- ▶ Connected Vehicles/ Autonomous Vehicle technology





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Consistent with Regional Goals

- ▶ Competitiveness for Regional Funding
- ▶ What is the Regional Goal?
 - ↳ ICM?
 - ↳ Shared Mobility?
 - ↳ Reduce Congestion and Delay?





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Bottom Line

- ▶ If TSMO is part of agency mission – and TSMO strategies are being deployed/operated, they need their own program plan (just like other agency programs)
- ▶ This is new – to both TSMO managers – and to planners
- ▶ There is new ground to be broken – in defining what should be in a TSMO program plan, who does it, how it is done, etc.
- ▶ You can be part of the solution





Useful Publications: USDOT (www.plan4operations.dot.gov)

- ▶ A Primer – Statewide Opportunities for Linking Planning and Operations
- ▶ Advancing Metropolitan Planning for Operations: An Objectives-Driven, Performance-Based Approach – A Guidebook
- ▶ Advancing Metropolitan Planning for Operations: Set Objectives, Measure Progress, See Results
- ▶ Advancing Metropolitan Planning for Operations: The Building Blocks of a Model Transportation Plan Incorporating Operations – A Desk Reference
- ▶ An Interim Guidebook on the Congestion Management Process in Metropolitan Transportation Planning
- ▶ Applying a Regional ITS Architecture to Support Planning for Operations: A Primer
- ▶ Creating an Effective Program to Advance Transportation Systems Management and Operations: Primer
- ▶ Delaware Valley Regional Planning Commission Philadelphia Metropolitan Region Case Study
- ▶ Developing Decision maker Support for Management and Operations at MetroPlan Orlando



Useful Publications:

USDOT (www.plan4operations.dot.gov)

- ▶ Getting More by Working Together – Opportunities for Linking Planning and Operations: A Reference Manual
- ▶ Management & Operations in the Metropolitan Transportation Plan: A Guidebook for Creating an Objectives-Driven, Performance-Based Approach
- ▶ Operations Benefit/Cost Analysis Desk Reference
- ▶ Regional Concept for Transportation Operations: A Tool for Strengthening and Guiding Regional Transportation Operations Collaboration and Coordination
- ▶ Regional Concept for Transportation Operations: The Blueprint for Action – A Primer
- ▶ Regional Transportation Operations Collaboration and Coordination: A Primer for Working Together to Improve Transportation Safety, Reliability, and Security
- ▶ The Collaborative Advantage: Realizing the Tangible Benefits of Regional Transportation Operations Collaboration
- ▶ The Regional Concept for Transportation Operations: A Practitioner's Guide
- ▶ Wilmington Area Planning Council New Castle County, Delaware and Cecil County, Maryland Case Study



Useful Publications: SHRP2 Reliability

(www.trb.org/StrategicHighwayResearchProgram2SHRP2/Pages/Reliability_Projects_302.aspx)

- ▶ Integrating Business Processes to Improve Reliability
- ▶ Establishing Monitoring Programs for Mobility and Travel Time Reliability
- ▶ Analytic Procedures for Determining the Impacts of Reliability Mitigation Strategies
- ▶ Incorporating Reliability Performance Measures in Operations and Planning Modeling Tools
- ▶ Incorporating Reliability Performance Measures into the Transportation Planning and Programming Processes
- ▶ Institutional Architectures to Advance Operational Strategies
- ▶ Evaluation of Cost-Effectiveness of Highway Design Features
- ▶ Incorporation of Travel Time Reliability into the Highway Capacity Manual
- ▶ Incorporation of Non-recurrent Congestion Factors into the AASHTO Policy on Geometric Design
- ▶ Feasibility of Using In-Vehicle Video Data to Explore How to Modify Driver Behavior that Causes Non-Recurring Congestion
- ▶ Evaluating Alternative Operations Strategies to Improve Travel Time Reliability
- ▶ Improving Traffic Incident Scene Management
- ▶ Archive for Reliability and Related Data



Useful Publications: SHRP2 Reliability

(www.trb.org/StrategicHighwayResearchProgram2SHRP2/Pages/Reliability_Projects_302.aspx)

- ▶ Design and Implement a System for Archiving and Disseminating Data from SHRP 2 Reliabilities and Related Studies/ Assistance to Contractors to Archive their Data for Reliability Projects
- ▶ Traveler Information and Travel Time Reliability
- ▶ Innovative IDEA Projects
- ▶ Assistance to Contractors to Archive Their Data for Reliability and Related Projects
- ▶ A Framework for Improving Travel Time Reliability
- ▶ e-Learning for Training Traffic Incident Responders and Managers
- ▶ Post-Course Assessment and Reporting Tool for Trainers and TIM Responders Using the SHRP 2 Interdisciplinary Traffic Incident Management Curriculum
- ▶ Validation of Urban Freeway Models
- ▶ e-Tool for Business Processes to Improve Travel Time Reliability
- ▶ Local Methods for Modeling, Economic Evaluation, Justification and Use of the Value of Travel Time Reliability in Transportation Decision Making
- ▶ Regional Operations Forums for Advancing Systems Operations, Management, and Reliability
- ▶ Pilot Testing of SHRP 2 Reliability Data and Analytical Products
- ▶ Reliability Implementation Support